

# **HTO transport and OBT formation in atmosphere-vegetation-soil system after wet deposition of atmospheric HTO onto soil**

Masakazu Ota\*, Haruyasu Nagai

*Research Group for Environmental Science, Division of Environment and Radiation Sciences, Nuclear Science and Engineering Directorate, Japan Atomic Energy Agency*

## **ABSTRACT**

A simulation study was carried out, to evaluate formation of organically-bound tritium (OBT) after wet deposition of atmospheric HTO onto soil, a process which would be important for an accidental HTO release into atmosphere. To quantitatively evaluate tritium transfers in atmosphere-vegetation-soil system, we adopted a sophisticated numerical-model SOLVEG-II which calculates turbulent diffusion of HTO in atmosphere and vegetation canopy, diffusion and advection of gaseous and aqueous HTO in soil, and, exchange and assimilation of tritium in leaves, in conjunction with transport of heat and water, and CO<sub>2</sub> exchange. Tritium exchange and assimilation in leaves covers exchange of atmospheric HTO and tissue free water tritium (TFWT) via stomata, photosynthetic assimilation of TFWT into OBT, and, translocation of the assimilated OBT. In the present study, evaporation and condensation between atmospheric HTO and rainwater have been newly modeled, to calculate wet deposition of atmospheric HTO onto soil (wash out). Then a simulation was carried out, assuming an acute release of atmospheric HTO during nighttime at which a rainfall event exists. Successive TFWT variation and OBT formation in daytime, mainly affected by uptake of soil HTO by roots and exchange of re-emitted atmospheric HTO via stomata, were then calculated, and, importance of wet deposition and re-emission of HTO for the OBT formation was discussed.

\*Corresponding author

**Postal address:** 2-4 Shirakata-Shirane, Tokai-mura, Naka-gun, Ibaraki, 319-1195 Japan; **Tel:** +81-29-282-6860; **Fax:** +81-29-282-5857; **E-mail:** [ohata.masakazu@jaea.go.jp](mailto:ohata.masakazu@jaea.go.jp)

